REMARKS

Claim 1 is amended. New claims 63-72 are added. Claims 1, 4-16 and 56-72 are pending in the application.

Claims 1, 4-11, 13-15 and 56 stand rejected under 35 U.S.C. §102(b) as being anticipated by Ramakrishnan (US Patent No. 5,192,871). Claims 12 and 16 stand rejected under 35 U.S.C. §103 as being unpatentable over Ramakrishnan in view of Graettinger (US Patent No. 5,844,771). Claims 57-59 stand rejected under 35 U.S.C. §103 as being unpatentable over Ramakrishnan in view of Howard (US Patent No. 4,437,139). Claims 60-62 stand rejected under 35 U.S.C. §103 as being unpatentable over Ramakrishnan in view of Eguchi (US Patent No. 5,442,585) and Shrivastava (US 5,557,122).

Regarding the rejection against claim 1 as being anticipated by Ramakrishnan, claim 1 recites that a high K substantially crystalline material is at least 70% crystalline and less than 98% crystalline. The Examiner states Ramakrishnan teaches 100% crystalline material to have the highest possible dielectric layer (page 7 of Paper No. 21). Ramakrishnan teaches insulative layer 16 is crystalline in form and fails to disclose or suggest the claimed percentages. Accordingly, in no fair or reasonable interpretation does Ramakrishnan teach or suggest the high K substantially crystalline material layer is at least 70% crystalline and less than 98% crystalline as recited in claim 1. Ramakrishnan fails to teach a positively recited limitation in claim 1, and therefore, claim 1 is allowable. Support

for claim 1 is provided at least at page 7 of the originally-filed specification. Applicant respectfully requests allowance of claim 1 in the next office action.

Claims 4-16 and 56-62 depend from independent claim 1, and therefore, are allowable for the reasons discussed above with respect to the independent claim, as well as for their own recited features which are neither shown or taught by the art of record.

Regarding the obviousness rejection against claims 57-59 based on the combination of Ramakrishnan '871 and Howard, the claims recite an insulative layer intermediate a substrate and first and second capacitor electrodes. The combination of art is improper for at least the following reasons, and therefore, the rejection fails.

More specifically, the Examiner is respectfully reminded that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggesting, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. MPEP §2143.01 (8th Edition), *citing In re Fine,* 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones,* 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). "In determining the propriety of the patent office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art **having the reference before him** to make the

proposed substitution, combination, or other modification." MPEP §2143.01 (8th Edition), *citing In re Litner*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972) (emphasis added). Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so". 916 F.2d at 682, 16 USPQ2d at 1432; MPEP §2143.01 (8th Edition); See also *In re Finch,* 972 F.2d, 1260, 23 USPQ2d, 1780 (Fed. Cir. 1992). The above authority clearly demonstrates that a **motivational** rationale to modify or combine references to teach the claimed invention of an applicant is imperative for a proper obviousness rejection. "Preferably the Examiner's explanation should be such that it provides that impetus necessary to cause one skilled in the art to combine the teachings of the references to make the proposed modification." *Ex Parte Levengood,* 28 USPQ2d, 1300, 1301, Footnote 2, (Bd. Pat. App. and Inter. 1993) (citations omitted).

The Examiner correctly states Ramakrishnan '871 fails to teach an insulative layer between the substrate and capacitor electrodes, and attempts to correct the deficiency by alleging Howard teaches the limitation, and provides an alleged motivational rationale for the combination as to isolate the capacitor from the substrate as suggested by Howard (pg. 5 of paper 21). However, having the Ramakrishnan `871 reference before one skilled in the art with the understandings of the teachings therein, such person would not be motivated to look to the teachings of Howard to make the proposed modification of the Ramakrishnan `871

invention. Ramakrishnan `871 is devoid of any teaching or suggestion for isolating the capacitor from the substrate. Accordingly, no reasonable or fair argument can be presented that Ramakrishnan `871 is concerned with isolating the capacitor from the substrate, and therefore, one skilled in the art would not be motivated to look to the teachings of Howard. That is, there is no impetus to cause one skilled in the art with the understanding of the teachings of Ramakrishnan `871 to look to Howard for additional teachings, and therefore, combining the teachings of the references is improper. The motivational rationale for the combination simply does not exist, and therefore, the obviousness rejection must fail. For at least this reason, Applicant respectfully requests allowance of claims 57-59 in the next office action.

Moreover, since the Ramakrishnan `871 invention is not concerned with isolating the capacitor from the substrate, the Examiner is simply suggesting the references can be combined, and therefore, alleging the obviousness rejection is appropriate. The Examiner is respectfully reminded that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP §2143.01 (8th Edition), *citing In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). No teaching exists for **the desirability** for isolating the capacitor from the substrate in the Ramakrishnan `871 invention as explained previously. The Examiner has not presented any desirable motivational rationale for the combination, and therefore, the combination of references is inappropriate. For at

least this reason, the motivational rationale for the combination does not exist, and therefore, the obviousness rejection against claims 57-59 must fail. Applicant respectfully requests allowance of claims 57-59 in the next office action.

Furthermore, regarding the obviousness rejection against claims 60-62 based on the combination of Ramakrishnan '871 in view of Eguchi and Shrivastava, the claims recite specific thicknesses for an amorphous material layer, crystalline material layer and capacitor dielectric region, respectively. The combination of art is improper for at least the following reasons, and therefore, the rejection fails.

The Examiner correctly states Ramakrishnan '871 fails to teach the specific thicknesses for an amorphous material layer, crystalline material layer and capacitor dielectric region. The Examiner attempts to correct the deficiency by alleging such teachings would be an obvious design choice based on the teachings of Shrivastava and Eguchi because such thicknesses are variable subject to routine experimentation for the optimal or workable ranges, and cites to *In re Aller,* 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955) (pgs. 5-6 of paper 21). However, this is contrary to the interpretation of *Aller* presented by the MPEP section addressing routine experimentation for the optimal or workable ranges. "Generally, differences in **concentration or temperature** will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such **concentration or temperature** is critical." MPEP §2144.05 II. A. *citing In re Aller,* 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955) (emphasis added). That is, only

concentration or temperature are relevant physical characteristics to the routine experimentation for the optimal or workable ranges determination, and nothing is stated by the MPEP regarding a physical characteristics such as specific thicknesses. Accordingly, the motivational rationale presented by the Examiner is contrary to case law and is clearly contrary to the MPEP discussing the same case law. Consequently, the combination of art is improper, and therefore, the obviousness rejection against claims 60-62 must fail. Applicant respectfully requests allowance of claims 60-62 in the next office action.

If the Examiner maintains the obviousness rejection based on Ramakrishnan '871 in view of Eguchi and Shrivastava against claims 60-62, Applicant respectfully requests identification of additional prior art or specific teachings within the existing art in a non-final office action which discloses the alleged teachings suggested by the Examiner, or the submission of an affidavit to support the Examiner's rejection, pursuant to MPEP §2144.03 and 37 C.F.R. §1.104(d)(2). "Assertions of technical facts in areas of esoteric technology must always be supported by citation of some reference" and "allegations concerning specific 'knowledge' of the prior art, which might be particular to a particular art should also be supported." *In re Ahlert*, 424 F.2d 1088, 165 USPQ 418, 420-421 (CCPA 1970) (emphasis added). 37 C.F.R. §1.104(d)(2) states "when a rejection in an application is based on facts within the personal knowledge of an employee of the office, the rejection must be supported by an affidavit when called for by the applicant." The Examiner is relying on the

conclusion that respective recited limitations of claims 60-62 is an obvious design choice subject to routine experimentation for the optimal or workable ranges, without pointing to any teaching of such limitation. Accordingly, the rejection can only be based upon the personal knowledge of the Examiner. Without supporting prior art, affidavit or other evidence that Applicant can rebut, Applicant is denied an opportunity during prosecution to properly respond to the obviousness rejection due to the lack of prior art. According to 37 CFR §1.104(d)(2), Applicant should have the opportunity to contradict or explain such prior art. The lack of prior art to support the Examiner's rejection clearly indicates Applicant's claims are not obvious. Identification of additional prior art or specific teachings within the existing art, or an affidavit, is requested and appropriate.

This application is now believed to be in immediate condition for allowance, and action to that end is respectfully requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview prior to issuance of any such subsequent action.

Respectfully submitted,

Dated: 8-8-02 By: _____

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. 09/512,149
Filing Date ..... February 23, 2000
Inventor ..... Vishnu K. Agarwal
Assignee ..... Micron Technology, Inc.
Group Art Unit 2814
Examiner ..... Marcos Pizarro-Crespo
Attorney's Docket No. MI22-1322
Title: Integrated Circuitry Including A Capacitor With An Amorphous And A Crystalline High K Capacitor Dielectric Region

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING RESPONSE TO MAY 8, 2002 FINAL OFFICE ACTION TO ACCOMPANY RCE FILING

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

1. (Amended) Integrated circuitry comprising a capacitor comprising a first capacitor electrode, a second capacitor electrode and a high K capacitor dielectric region received therebetween; the high K capacitor dielectric region comprising a high K substantially amorphous material layer and a high K substantially crystalline material layer, the high K substantially amorphous material and the high K substantially crystalline material constituting different chemical compositions, the high K substantially crystalline material being received over the high K substantially amorphous material; and

wherein the high K substantially crystalline material layer is at least 70% crystalline and less than 98% crystalline.

Please add the following new claims:

New Claims

63. (New) Integrated circuitry comprising:

a substrate having insulative material formed over the substrate; and

an opening formed in the insulative material; and

a capacitor comprising:

a first electrode layer formed within the opening;

a high K dielectric layer formed over the first electrode layer and within the opening; and

a second electrode layer formed over the high K dielectric layer.

64. (New) The integrated circuitry of claim 63 wherein the high K dielectric layer has at least a portion comprising crystalline material.

65. (New) The integrated circuitry of claim 63 wherein the high K dielectric layer has at least a portion comprising amorphous material.

66. (New) The integrated circuitry of claim 63 wherein the high K dielectric layer comprises a portion of amorphous material and a portion of crystalline material.

67. (New) The integrated circuitry of claim 63 wherein the high K dielectric layer comprises an amorphous layer adjacent the first electrode layer and a crystalline layer adjacent the second electrode layer.

68. (New) The integrated circuitry of claim 63 wherein the high K dielectric layer comprises a crystalline layer adjacent the first electrode layer and an amorphous layer adjacent the second electrode layer.

69. (New) The integrated circuitry of claim 63 wherein the high K dielectric layer has at least a portion comprising less than or equal to 98% crystalline material.

70. (New) The integrated circuitry of claim 63 wherein the high K dielectric layer has at least a portion comprising less than or equal to 98% amorphous material.

71. (New) The integrated circuitry of claim 63 wherein the opening comprises a trench.

72. (New) The integrated circuitry of claim 63 wherein the second electrode layer is formed within the opening.

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